

SERVICE MANUAL (Expanded Information)

KS1822

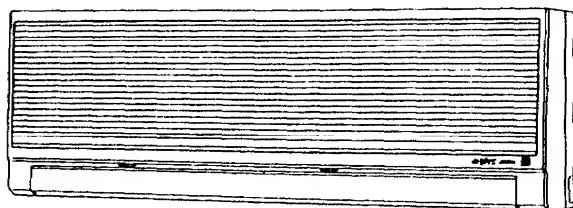


**C1822
CL1822**

SANYO

SPLIT SYSTEM AIR CONDITIONER

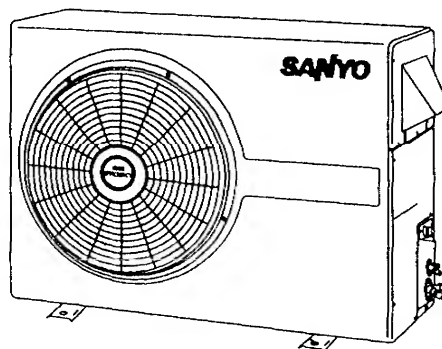
Indoor Unit



KS1822



Outdoor Unit



C1822 / CL1822

SERVICE MANUAL

KS1822 — C1822
CL1822

(Expanded Information)

IMPORTANT! Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning
- Follow each installation or repair step exactly as shown
- Observe all local, state, and national electrical codes
- Pay close attention to all warning and caution notices given in this manual



WARNING:

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION:

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "narrow" or "wide" rather than as "liquid" or "gas."

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

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1. SPECIFICATIONS

1-1 Unit Specifications

| | | | | |
|---------------------|---|--------------|---|----------------|
| Model No. | | Indoor Unit | KS1822 | |
| | | Outdoor Unit | C1822 / CL1822 | |
| Performance | | | Cooling | |
| | Capacity | BTU/h | 17,000 / 16,500 | |
| | | kW | 4.98 / 4.84 | |
| | Air circulation (High) | | cu. ft./min. 440 / 420 | |
| Electrical Rating | Moisture removal (High) | | pints/h 5.3 / 5.2 | |
| | Phase, Frequency | | Hz Single, 60 | |
| | Voltage rating | | V 230 / 208 | |
| | Available voltage range | | V 187 to 253 | |
| | Running amperes | | A 7.6 / 8.2 | |
| | Power input | | W 1,720 / 1,670 | |
| | Power factor | | % 98 / 98 | |
| | Starting amperes | | A 41.4 | |
| Features | S. E. E. R. | | BTU/Wh 10.4 / 10.4 | |
| | Controls | | Microprocessor | |
| | Control unit | | Wireless remote control unit | |
| | Temperature control | | IC thermostat | |
| | Timer | | ON/OFF, 24-hours & Program | |
| | Fan speeds | | Indoor / Outdoor 3 and Auto / 1 | |
| | Air deflector | | Horizontal / Vertical Manual / Automatic | |
| | Air filter | | Washable, easy access | |
| | Compressor | | Rotary | |
| | Refrigerant amount charged at shipment | | lbs. (kg) R22, 4.45 (2.02) | |
| | Refrigerant control | | Capillary tube | |
| | Refrigerant tubing connections | | Flare type | |
| | Operation sound | In-Hi/Me/Lo | dB-A 47 / 44 / 40 | |
| | | Out-Hi | dB-A 55 | |
| | Max. allowable tubing length at shipment | | ft. (m) 33 (10) | |
| | Limit of tubing length | | ft. (m) 65 (20) | |
| | Limit of elevation difference between the 2 units | | ft. (m) Outdoor unit is higher than indoor unit. 23 (7) Outdoor unit is lower than indoor unit. 23 (7) | |
| | Refrigerant tube o.d. | Narrow tube | in. (mm) 1/4 (6.35) | |
| | | Wide tube | in. (mm) 5/8 (15.88) | |
| Dimensions & Weight | Refrigerant tube kit | | Optional | |
| | Accessories | | Hanging wall bracket | |
| | | | Indoor unit | Outdoor unit |
| | Height | | in. (mm) 14-3/16 (360) | 24-13/16 (630) |
| | Width | | in. (mm) 38-31/32 (990) | 32-11/16 (830) |
| | Depth | | in. (mm) 7-25/32 (198) | 12-13/32 (315) |
| | Net weight | | lbs. (kg) 30 (13.5) | 121 (55) |
| Dimensions & Weight | Shipping volume | | cu. ft. (cu. m) 4.8 (0.136) | 10.4 (0.294) |
| | Shipping weight | | lbs. (kg) 37.4 (17) | 130 (59) |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are: Outside air temperature 95°F DB/75°F WB
Indoor unit entering air temperature 80°F DB/67°F WB

1-2 Major Component Specifications

(1) Indoor and Outdoor Units

(a) KS1822 (Indoor unit)

| | | | | | | | |
|---------------------|--|-----------------|----------|-------------------------------------|--|--|--|
| Unit Model No. | | | | KS1822 | | | |
| Remote Control Unit | | | | RCS-KS2412W | | | |
| Controller PCB | | | | POW-KS1812B | | | |
| | Control circuit fuse | | | 250V, 3A | | | |
| Fan | Type | | | Cross-flow | | | |
| | Number ... Dia. and length in. (mm) | | | 1 ... O.D. 4 (100), L 29-9/32 (755) | | | |
| Fan Motor | Model ... Number | | | UF4T-31A6P ... 1 | | | |
| | No. of pole ... rpm (230V, High) | | | 4 ... 1,590 | | | |
| | Nominal output W(H.P.) | | | 30 (1/25) | | | |
| | Coil resistance (Ambient temp. 68°F) Ω | | | WHT – BRN: 102.6 | | | |
| | | | | WHT – VLT: 37.1 | | | |
| | | | | VLT – YEL: 30.9 | | | |
| | | | | YEL – PNK: 69.3 | | | |
| | Safety devices | Type | | Internal | | | |
| | | Operating temp. | Open °F | 248 ± 9 | | | |
| | Close °F | | 171 ± 27 | | | | |
| Run capacitor | | μF | 1.5 | | | | |
| | | VAC | 440 | | | | |
| Louver Motor | Model | | | M2EA24ZA01 | | | |
| | Rating | | | 208 to 230V, 60Hz | | | |
| | No. of pole ... rpm. | | | 8 ... 3 | | | |
| | Output W | | | 2.5 | | | |
| | Coil resistance (at 68°F) kΩ | | | 16.45 ± 15% | | | |
| Heat Exch. | Coil | | | Aluminum plate fin / Copper tube | | | |
| | Rows ... Fins per inch | | | 2 ... 14.1 | | | |
| | Face area ft. ² (m ²) | | | 2.08 (0.19) | | | |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

(b) C1822 (Outdoor unit)

| | | | | | | | | |
|--|----------------------------------|-----------------------|-------|-----|------------------------------------|--------------------|----------|--|
| Unit Model No. | | | | | C1822 | | | |
| Fuse | | | | | AC 250V, 3A | | | |
| Compressor | Type | | | | Rotary (hermetic) | | | |
| | Model ... Number | | | | C-2R130H6P ... 1 | | | |
| | No. of cyl. ... rpm | | | | 1 ... 3,500 | | | |
| | Nominal output | | | | W (H.P.) | 1,300 (1-3/4) | | |
| | Compressor lubricant | | | | cc | 800 | | |
| | Coil resistance | | | | Ω | C – R: 1.19 | | |
| | (Ambient temp. 77°F) | | | | | C – S: 2.47 | | |
| | Safety devices | Type | | | | Internal | External | |
| | | Overload relay models | | | | — | — | |
| | | Operating temp. | Open | °F | 311 ± 9 | | | |
| | | | Close | °F | 188 ± 20 | | | |
| Operating amp. (Ambient temp. 77°F) | | | | — | — | | | |
| Run capacitor | | μF | | 30 | | | | |
| | | VAC | | 400 | | | | |
| Crank case heater | | | | — | | | | |
| Fan | Type | | | | Propeller | | | |
| | Number ... Dia. | | | | in. (mm) | 1 ... 15-3/4 (400) | | |
| Fan Motor | Model | | | | SFG6S-61B6P | | | |
| | No. of pole ... rpm (230V, High) | | | | 6 ... 1,030 | | | |
| | Nominal output | | | | W (H.P.) | 60 (1/12) | | |
| | Coil resistance | | | | Ω | WHT – BRN: 88.2 | | |
| | (Ambient temp. 68°F) | | | | | WHT – YEL: 116.3 | | |
| | | | | | | WHT – PNK: 116.4 | | |
| | Safety devices | Type | | | | Internal | | |
| | | Operating temp. | Open | °F | 266 ± 14 | | | |
| | | | Close | °F | 174 ± 27 | | | |
| Run capacitor | | μF | | 2.5 | | | | |
| | | VAC | | 440 | | | | |
| Heat Exch. | Coil | | | | Aluminum plate fin / Copper tube | | | |
| | Rows ... fins per inch | | | | 2 ... 15.9 | | | |
| | Face area | | | | ft. ² (m ²) | 5.57 (0.51) | | |
| External Finish | | | | | Acrylic baked-on enamel finish | | | |

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(c) CL1822 (Outdoor unit)

| | | | | | | | | |
|-------------------|----------------------------------|--|------------------------------------|----------------------|----------------------------------|----------|--|----------|
| Unit Model No. | | | | | CL1822 | | | |
| Controller PC3 | | | | | POW-183CL | | | |
| | Control circuit fuse | | | | AC 250V, 5A | | | |
| Compressor | Type | | | | Rotary (hermetic) | | | |
| | Model ... Number | | | | C-2R130H6P ... 1 | | | |
| | No. of cyl. ... rpm | | | | 1 ... 3,500 | | | |
| | Nominal output | | W (H.P.) | | 1,300 (1-3/4) | | | |
| | Compressor lubricant | | | | cc 800 | | | |
| | Coil resistance | | Ω | | C - R: 1.19 | | | |
| | (Ambient temp. 77°F) | | | | C - S: 2.47 | | | |
| | Safety devices | Type | | | | Internal | | External |
| | | Overload relay models | | | | — | | — |
| | | Operating temp. | Open | $^{\circ}\text{F}$ | | 311 ± 9 | | — |
| | | | Close | $^{\circ}\text{F}$ | | 188 ± 20 | | — |
| | | Operating amp. (Ambient temp. 77°F) | | | | — | | — |
| | Run capacitor | | | | μF 30 | | | |
| | | | | VAC 400 | | | | |
| Crank case heater | | | | 230V, 30W | | | | |
| Fan | Type | | | | Propeller | | | |
| | Number ... Dia. | | in. (mm) | | 1 ... 15-3/4 (400) | | | |
| Fan Motor | Model | | | | SFG6S-61B6P | | | |
| | No. of pole ... rpm (230V, High) | | | | 6 ... 1,030 | | | |
| | Nominal output | | W (H.P.) | | 60 (1/12) | | | |
| | Coil resistance | | Ω | | WHT - BRN: 88.2 | | | |
| | (Ambient temp. 68°F) | | | | WHT - YEL: 116.3 | | | |
| | | | | | WHT - PNK: 116.4 | | | |
| | Safety devices | Type | | | | Internal | | |
| | | Operating temp. | Open | $^{\circ}\text{F}$ | | 266 ± 14 | | |
| | | | Close | $^{\circ}\text{F}$ | | 174 ± 27 | | |
| Run capacitor | | | | μF 2.5 | | | | |
| | | | | VAC 440 | | | | |
| Heat Exch. | Coil | | | | Aluminum plate fin / Copper tube | | | |
| | Rows ... fins per inch | | | | 2 ... 15.9 | | | |
| | Face area | | ft. ² (m ²) | | 5.57 (0.51) | | | |
| External Finish | | | | | Acrylic baked-on enamel finish | | | |

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

1-3 Other Component Specifications

(1) Indoor Unit

| Transformer | | ATR-H122U |
|-----------------------|--------------------|--------------------------------------|
| Rated | Primary | AC 220V, 60Hz |
| | Secondary | 10V, 1.2A |
| | Capacity | 12VA |
| Coil resistance | Ω (at 77°F) | Primary (WHT – WHT): 146 \pm 15% |
| | | Secondary (BRN – BRN): 0.5 \pm 15% |
| Thermal cut-off temp. | | 259°F, 2A 250V |

| Relay | | DFU12D1-F(M) |
|-----------------|--------------------|----------------|
| Coil rating | | DC 12V |
| Coil resistance | Ω (at 68°F) | $160 \pm 10\%$ |
| Contact rating | | AC 250V, 20A |

| Thermistor (coil sensor) | | PBC-41E-S4 | | | |
|--------------------------|------------|------------|----------------|-------|---------------|
| Resistance | k Ω | 14°F | $23.7 \pm 5\%$ | 77°F | $5.3 \pm 5\%$ |
| | | 32°F | $15.0 \pm 5\%$ | 86°F | $4.4 \pm 5\%$ |
| | | 50°F | $9.7 \pm 5\%$ | 104°F | $3.1 \pm 5\%$ |
| | | 68°F | $6.5 \pm 5\%$ | | |

| Thermistor (room sensor) | | SDT-500B6-2 | | | |
|--------------------------|------------|-------------|----------------|-------|---------------|
| Resistance | k Ω | 50°F | $10.3 \pm 4\%$ | 86°F | $4.0 \pm 4\%$ |
| | | 59°F | $8.0 \pm 4\%$ | 104°F | $2.6 \pm 4\%$ |
| | | 68°F | $6.3 \pm 4\%$ | 122°F | $1.8 \pm 4\%$ |
| | | 77°F | $5.0 \pm 4\%$ | | |

(2) Outdoor Unit**CL1822**

| Thermostat | | MQT5S 27YZ | |
|-------------------|----|-------------------|------------|
| Operating temp. | °F | ON | 80 + 0, -5 |
| | | OFF | 74 + 0, -5 |

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| Transformer | | ATR-J122U | |
|-----------------------|-------------|--|--|
| Rated | Primary | AC 220V, 60Hz | |
| | Secondary | 19V, 0.63A | |
| | Capacity | 12VA | |
| Coil resistance | Ω (at 77°F) | Primary (WHT – WHT): 147 ± 10% Secondary (BRN – BRN): 1.3 ± 10% | |
| Thermal cut-off temp. | | 259°F, 2A 250V | |

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| Electro-Magnetic Contactor | | CLK-16E3-21 | |
|-----------------------------------|--------------|--------------------|--|
| Coil rating | | AC 240V, 60Hz | |
| Coil resistance | kΩ (at 77°F) | 2.5 ± 15% | |
| Contact rating | (Main) | AC 240V, 18A | |
| | (Auxiliary) | AC 240V, 3A | |

CL1822

| Relay | | MY2F-T1-USTS | |
|-----------------|-------------|---------------------|--|
| Coil rating | | DC 24V | |
| Coil resistance | Ω (at 77°F) | 650 ± 15% | |
| Contact rating | | AC 240V, 5A | |

CL1822

| Thermistor (Air and coil sensor) | | PBC-41E-S8, PBC-41E-S15 | | | |
|---|----|--------------------------------|-----------|-------|----------|
| Resistance | kΩ | 14°F | 23.7 ± 5% | 77°F | 5.3 ± 5% |
| | | 32°F | 15.0 ± 5% | 86°F | 4.4 ± 5% |
| | | 50°F | 9.7 ± 5% | 104°F | 3.1 ± 5% |
| | | 68°F | 6.5 ± 5% | | |

CL1822

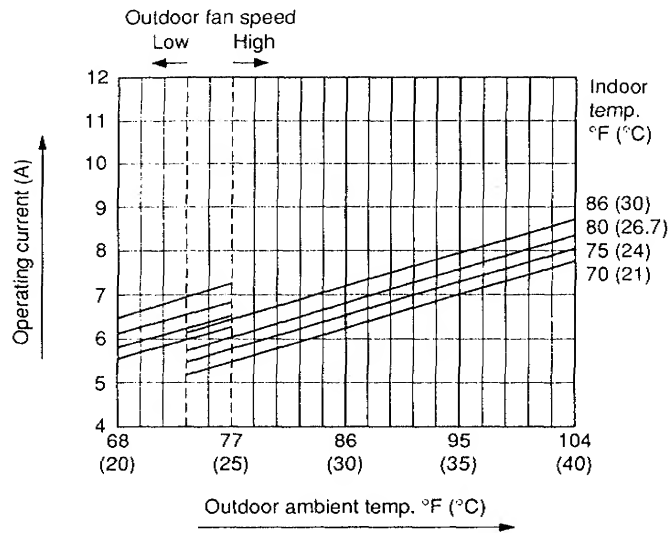
| SSR (solid state relay) | | G3L-205TL-TS1 | |
|--------------------------------|-----------------------|----------------------|--|
| Input | Rating voltage | DC 12V | |
| | Control voltage range | DC 0 to 6.4V | |
| Load voltage range | | AC 75 to 264V, 60Hz | |

2. PERFORMANCE CHARTS

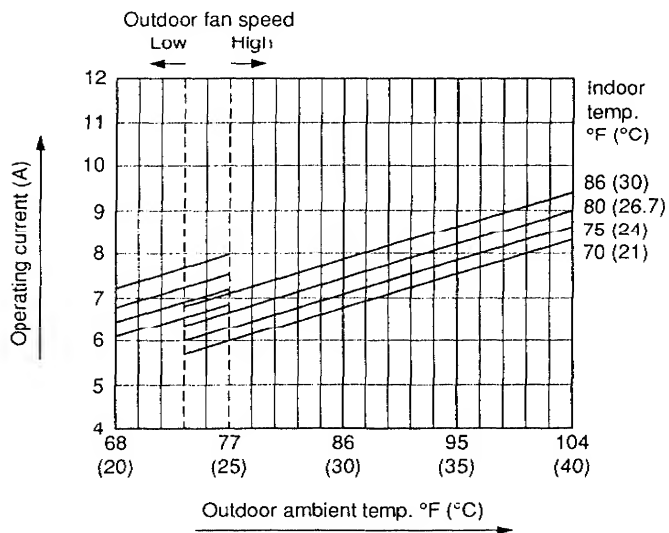
2-1 Operating Current

Operating current characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, Indoor fan speed: High)

230V



208V

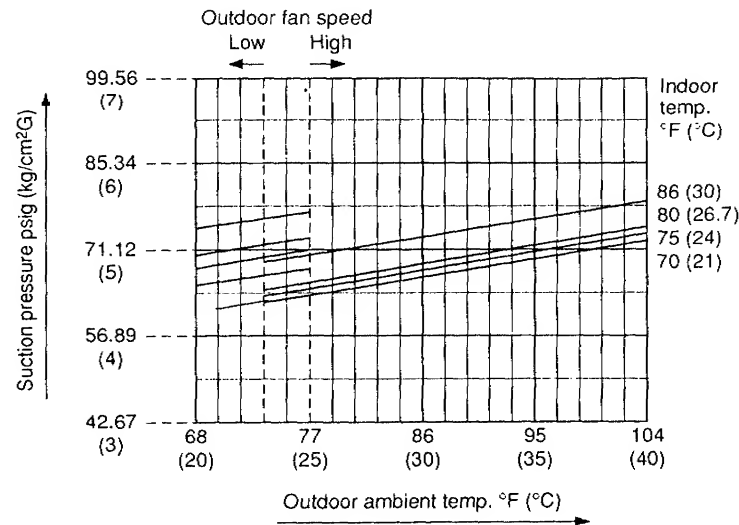


2-2 Low Pressure

■ KS1822 / C1822

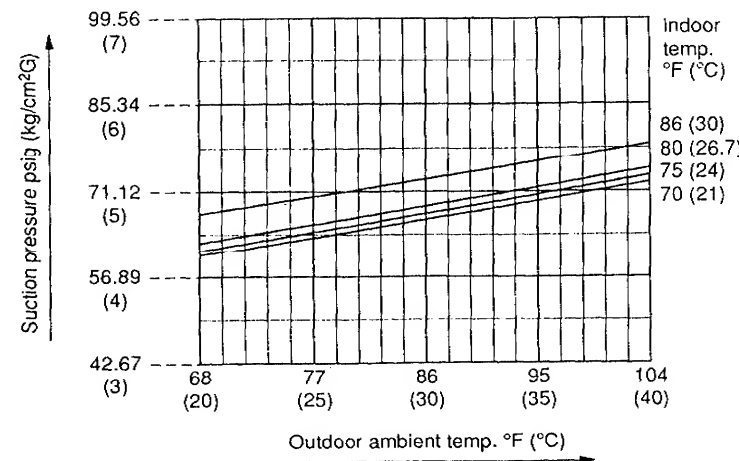
● Low Pressure

Low pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, Indoor fan speed: High)



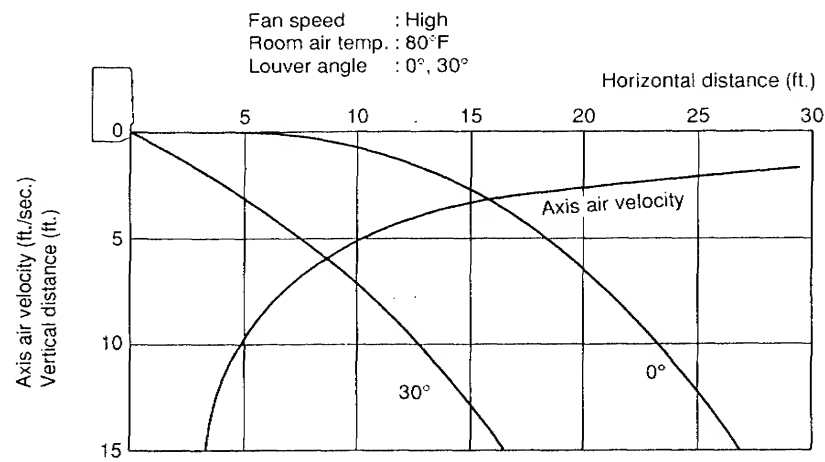
● Low Pressure

Low pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, Indoor fan speed: High)



3. AIR THROW DISTANCE CHART

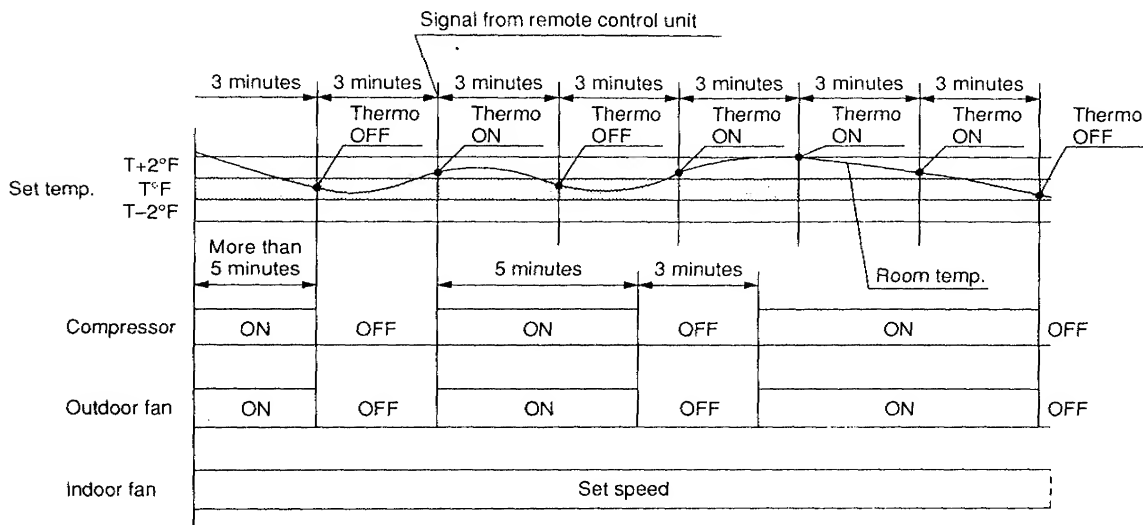
Model: KS1822



4. FUNCTION

4-1 Room Temperature Control

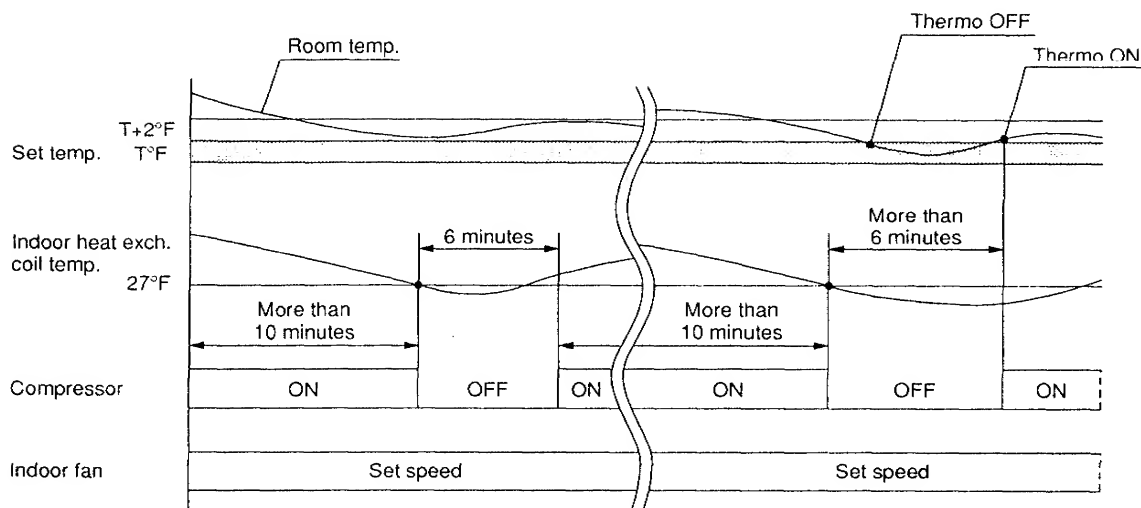
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.



- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 3 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- **Thermo ON :** When the room temperature is above $T + 2^\circ\text{F}$ ($T^\circ\text{F}$ is set temperature).
Compressor \rightarrow ON
- **Thermo OFF :** When the room temperature is equal to or below set temperature $T^\circ\text{F}$.
Compressor \rightarrow OFF

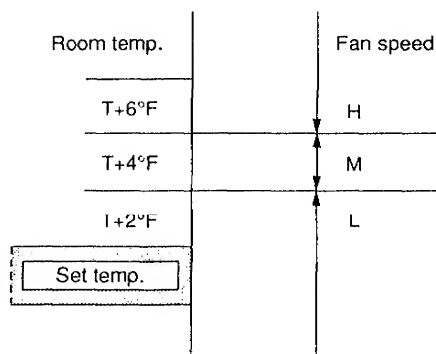
4-2 Freeze Prevention

- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes or more and the temperature of the indoor heat exchange coil falls below 27°F, the control circuit stops the compressor for at least 6 minutes.



4-3 Fan Speed Auto (Indoor Fan)

- The fan speed does not change within 1 minute.
- The number shows temperature for REMOCON sensor.

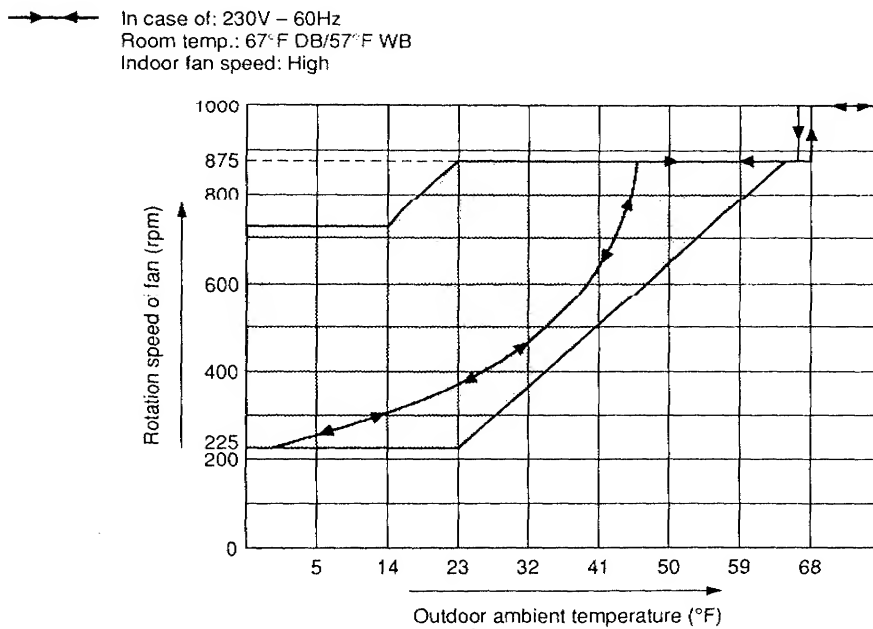


4-4 Outdoor Fan Speed Control (C1822)

- In low temperature areas, the outdoor fan goes automatically to LOW to prevent freezing.
- When the outdoor air temperature falls below 74°F, the outdoor fan is set to LOW.
- When the outdoor air temperature rises to 80°F, the outdoor fan is set to HIGH.

4-5 Outdoor Fan Speed Control (CL1822)

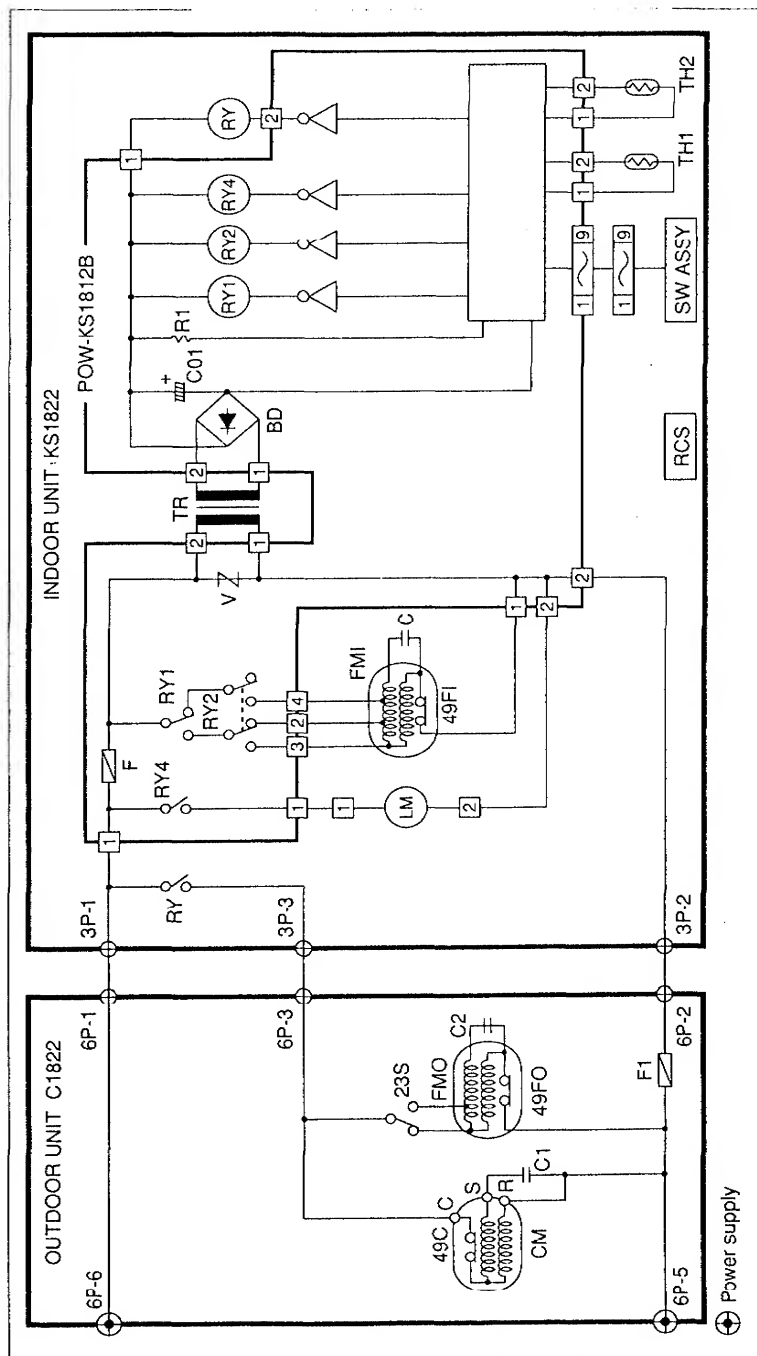
- When the outdoor air temperature falls below 66°F, the outdoor fan speed switches from HIGH to relative adjustment.
- The speed of fan rotation follows an oblique line under the outdoor and indoor air temperature conditions as shown in the diagram below.



5. ELECTRICAL DATA

● Schematic Diagram

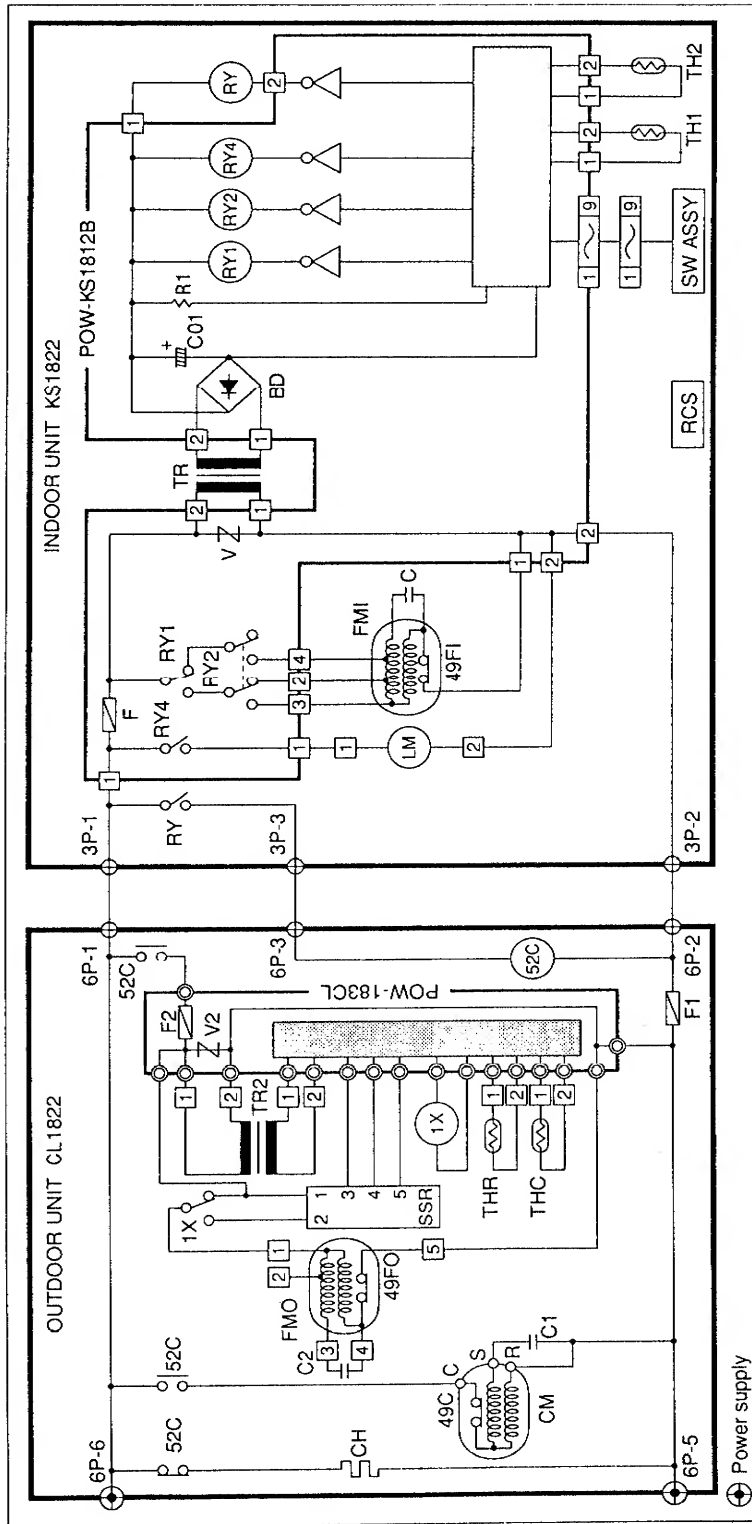
KS1822 / C1822



| Symbol | Description | Symbol | Description |
|--------------|--------------------------------------|---------------|--|
| OUTDOOR UNIT | | TR | TRANSFORMER |
| CM | COMPRESSOR MOTOR | RY | POWER RELAY |
| 49C | COMPRESSOR MOTOR INTERNAL PROTECTOR | TH1 | THERMISTOR (COIL TEMP. SENSOR) |
| 23S | THERMOSTAT | TH2 | THERMISTOR (ROOM TEMP. SENSOR) |
| FMO | OUTDOOR FAN MOTOR | SW ASSY | SWITCH ASSY SW-KS2412W |
| 49FO | OUTDOOR FAN MOTOR INTERNAL PROTECTOR | RCS | WIRELESS REMOTE CONTROL UNIT RCS-KS2412W |
| C1, C2 | CAPACITOR | | |
| F1 | FUSE: 250V, 3A | POW-KS1812B | CONTROLLER PCB ASSY |
| INDOOR UNIT | | F | FUSE: 250V, 3A |
| LM | LOLVER MOTOR | V | VARIATOR |
| FMI | INDOOR FAN MOTOR | BD | BRIDGE DIODE |
| 49FI | INDOOR FAN MOTOR INTERNAL PROTECTOR | CU1 | CAPACITOR |
| C | CAPACITOR | R1 | RESISTOR |
| | | R*1, RY2, RY4 | AUXILIARY RELAY |

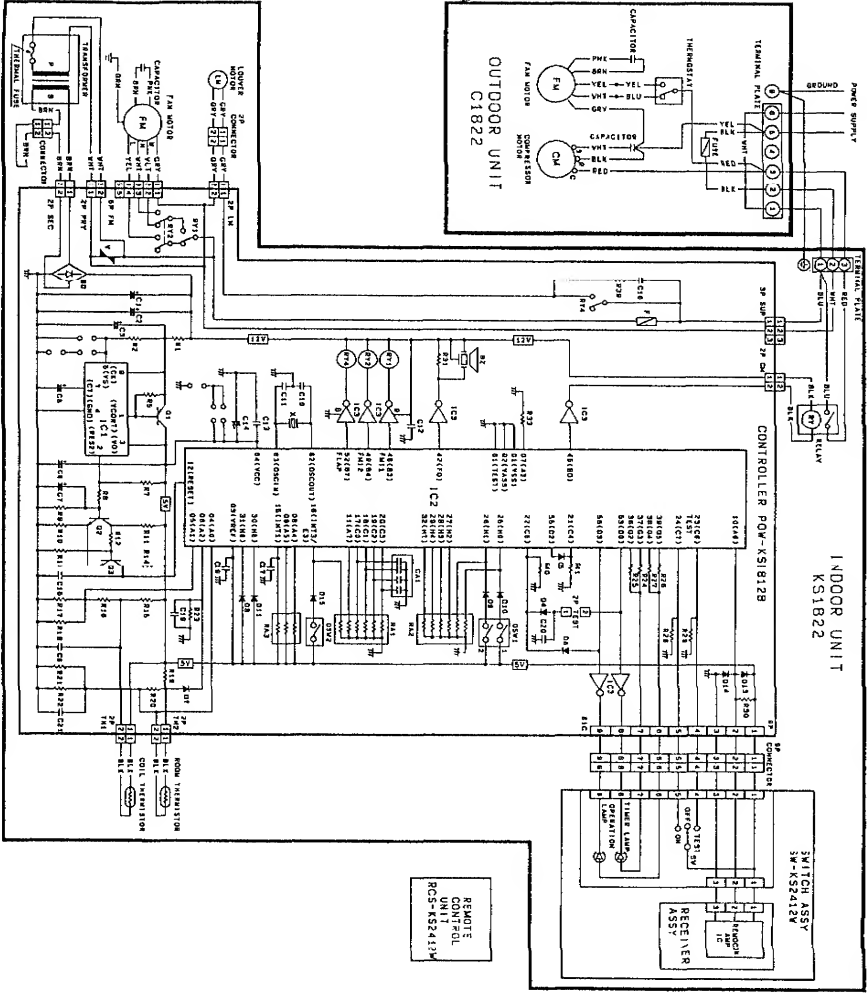
● Schematic Diagram

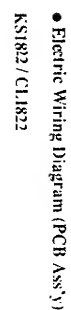
KS1822 / CL1822



| Symbol | Description | Symbol | Description |
|--------------|--------------------------------------|---------------|---|
| OUTDOOR UNIT | | INDOOR UNIT | |
| CH | CRANK CASE HEATER | LM | LOUVER MOTOR |
| CM | COMPRESSOR MOTOR | FMI | INDOOR FAN MOTOR |
| 49C | COMPRESSOR MOTOR INTERNAL PROTECTOR | 49FI | INDOOR FAN MOTOR INTERNAL PROTECTOR |
| FMO | OUTDOOR FAN MOTOR | C | CAPACITOR |
| 49FO | OUTDOOR FAN MOTOR INTERNAL PROTECTOR | TR | TRANSFORMER |
| C1, C2 | CAPACITOR | RY | RELAY |
| SSR | SOLID STATE RELAY | TH1 | THERMISTOR (COIL TEMP. SENSOR) |
| TR2 | TRANSFORMER | TH2 | THERMISTOR (ROOM TEMP. SENSOR) |
| IX | RELAY | SW ASSY | SWITCH ASSY SW-KS2412W |
| THR | THERMISTOR (AIR SENSOR) | RCS | WIRELESS REMOTE CONTROL UNIT RCS-KS212W |
| THC | THERMISTOR (COIL SENSOR) | POW-KS1812B | CONTROLLER PCB ASSY |
| 52C | ELECTRO-MAGNETIC CONTACTOR | F | FUSE 250V 3A |
| F1 | FUSE 250V 3A | V | VARIABLE |
| POW-183CL | CONTROLLER PCB ASSY | BD | BRIDGE DIODE |
| F2 | FUSE 250V 5A | CU | CAPACITOR |
| V2 | VARIABLE | R1 | RESISTOR |
| | | RY1, RY2, RY4 | AUXILIARY RELAY |

● Electric Wiring Diagram (PCB Assy)
KS1822 / C1822





POW-KS1812B

| Symbol | Description | Specifications |
|--------|--------------|----------------------|
| BZ101 | BUZZER | PKM24SP3805 |
| C1 | CAPACITOR | 2200 μ F 25V |
| C2 | CAPACITOR | 1 μ F 50V |
| C3 | CAPACITOR | 10 μ F 50V |
| C5 | CAPACITOR | 1 μ F 50V |
| C6 | CAPACITOR | 220 μ F 16V |
| C7 | CAPACITOR | 1 μ F 50V |
| C9 | CAPACITOR | 0.1 μ F 50V |
| C10 | CAPACITOR | 0.00003 μ F 50V |
| C11 | CAPACITOR | 0.00003 μ F 50V |
| C12 | CAPACITOR | 0.022 μ F 50V |
| C13 | CAPACITOR | 0.1 μ F 50V |
| C14 | CAPACITOR | 100 μ F 10V |
| C15 | CAPACITOR | 0.022 μ F 50V |
| C16 | CAPACITOR | 0.01 μ F 250V |
| C17 | CAPACITOR | 0.0047 μ F 50V |
| C18 | CAPACITOR | 0.022 μ F 50V |
| C19 | CAPACITOR | 0.022 μ F 50V |
| C20 | CAPACITOR | 0.022 μ F 50V |
| C21 | CAPACITOR | 0.1 μ F 50V |
| CA1 | CAPACITOR | 0.0047 μ F-4 50V |
| D4 | DIODE | DS446 |
| D5 | DIODE | DS446 |
| D6 | DIODE | DS446 |
| D7 | DIODE | DS446 |
| D8 | DIODE | DS446 |
| D9 | DIODE | DS446 |
| D10 | DIODE | DS446 |
| D11 | DIODE | DS446 |
| D13 | DIODE | DS446 |
| D14 | DIODE | DS446 |
| D15 | DIODE | DS446 |
| DSW1 | SWITCH | SSGM 2P |
| DSW2 | SWITCH | JKS1120-0401 |
| DB | BRIDGE DIODE | DBA10C |
| F | FUSE | 250V, 3A |
| IC1 | IC | LA5693D |
| IC2 | IC | TMS73C161-C76577 |
| IC3 | IC | LB1234 |
| Q1 | TRANSISTOR | 2SA1289 |
| Q2 | TRANSISTOR | 2SC536-E |
| Q3 | TRANSISTOR | 2SC536-E |

POW-KS1812B

| Symbol | Description | Specifications |
|---------|-------------------|-------------------------------|
| R1 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/2W |
| R2 | RESISTOR (CARBON) | 27K Ω \pm 5% 1/4W |
| R5 | RESISTOR (CARBON) | 390 Ω \pm 5% 1/4W |
| R7 | RESISTOR (CARBON) | 1K Ω \pm 5% 1/4W |
| R8 | RESISTOR (CARBON) | 27K Ω \pm 5% 1/4W |
| R9 | RESISTOR (CARBON) | 22K Ω \pm 5% 1/4W |
| R10 | RESISTOR (CARBON) | 560 Ω \pm 5% 1/4W |
| R11 | RESISTOR (CARBON) | 4.7K Ω \pm 5% 1/4W |
| R12 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/4W |
| R13 | RESISTOR (CARBON) | 8.2K Ω \pm 5% 1/4W |
| R14 | RESISTOR (CARBON) | 4.7K Ω \pm 5% 1/4W |
| R15 | RESISTOR (METAL) | 12K Ω \pm 1% 1/4W |
| R16 | RESISTOR (METAL) | 750 Ω \pm 1% 1/4W |
| R17 | RESISTOR (METAL) | 6.8K Ω \pm 1% 1/4W |
| R18 | RESISTOR (METAL) | 10K Ω \pm 1% 1/4W |
| R19 | RESISTOR (METAL) | 180 Ω \pm 1% 1/4W |
| R20 | RESISTOR (METAL) | 15K Ω \pm 1% 1/4W |
| R21 | RESISTOR (METAL) | 6.2K Ω \pm 1% 1/4W |
| R22 | RESISTOR (METAL) | 11K Ω \pm 1% 1/4W |
| R23 | RESISTOR (CARBON) | 100K Ω \pm 5% 1/4W |
| R24 | RESISTOR (CARBON) | 270 Ω \pm 5% 1/4W |
| R25 | RESISTOR (CARBON) | 270 Ω \pm 5% 1/4W |
| R26 | RESISTOR (CARBON) | 270 Ω \pm 5% 1/4W |
| R27 | RESISTOR (CARBON) | 270 Ω \pm 5% 1/4W |
| R28 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/4W |
| R29 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/4W |
| R30 | RESISTOR (CARBON) | 100K Ω \pm 5% 1/4W |
| R31 | RESISTOR (CARBON) | 6.8K Ω \pm 5% 1/4W |
| R33 | RESISTOR (CARBON) | 56K Ω \pm 5% 1/4W |
| R39 | RESISTOR (METAL) | 100 Ω \pm 1% 1W |
| R40 | RESISTOR (CARBON) | 56K Ω \pm 5% 1/4W |
| R41 | RESISTOR (CARBON) | 56K Ω \pm 5% 1/4W |
| RA1 | RESISTOR | 56K Ω -6 \pm 5% 1/4W |
| RA2 | RESISTOR | 56K Ω -6 \pm 5% 1/4W |
| RA3 | RESISTOR | 20K Ω -3 \pm 5% 1/4W |
| RY1 | RELAY | LZG-12HE |
| RY2 | RELAY | VB12TBU |
| RY4 | RELAY | LZG-12HE |
| V | VARIATOR | 3NП001KD14 |
| X | CRYSTAL | CSA-4MG |
| 3P SUP | CONNECTOR | 2-173270-3 |
| 5P FM | CONNECTOR | 2-173270-5 |
| 2P PRY | CONNECTOR | 8-173270-2 |
| 2P SEC | CONNECTOR | 5273-02A |
| 2P TEST | CONNECTOR | NHK-P2T-N |
| 2P TH1 | CONNECTOR | 8-171825-2 |
| 2P TH2 | CONNECTOR | 2-171825-2 |
| 2P CM | CONNECTOR | 5273-02A-BL |
| 2P LM | CONNECTOR | 2-173270-2 |

POW-183CL

| Symbol | Description | Specifications |
|-----------|-------------------|-----------------------------|
| BD | BRIDGE DIODE | DBA10C |
| C1 | CAPACITOR | 470 μ F 50V |
| C2 | CAPACITOR | 22 μ F 25V |
| C3 | CAPACITOR | 0.047 μ F 50V |
| C4 | CAPACITOR | 0.047 μ F 50V |
| C5 | CAPACITOR | 0.022 μ F 50V |
| C6 | CAPACITOR | 22 μ F 25V |
| C7 | CAPACITOR | 22 μ F 25V |
| C8 | CAPACITOR | 22 μ F 25V |
| C9 | CAPACITOR | 22 μ F 25V |
| C10 | CAPACITOR | 22 μ F 25V |
| C11 | CAPACITOR | 470 μ F 16V |
| C12 | CAPACITOR | 100 μ F 16V |
| C13 | CAPACITOR | 22 μ F 25V |
| C14 | CAPACITOR | 22 μ F 25V |
| C15 | CAPACITOR | 100 μ F 16V |
| C16 | CAPACITOR | 22 μ F 25V |
| C1 | CAPACITOR | 0.22 μ F 630V |
| C01 | CAPACITOR | 0.033 μ F 630V |
| C02 | CAPACITOR | 0.033 μ F 630V |
| D1 | DIODE | DSF10C |
| D2 to D12 | DIODE | DS446 |
| FUSE | FUSE | 250V, 5A |
| IC1 | IC | NJM2902 |
| IC2 | IC | LA6339 |
| IC3 | IC | NJM2902 |
| Q1 | TRANSISTOR | 2SC3400 |
| Q2 | TRANSISTOR | 2SC2274E |
| L1 | FILTER COIL | SN12-500 |
| L2 | FILTER COIL | SN12-500 |
| R1 | RESISTOR (OXIDE) | 240 Ω \pm 5% 2W |
| R2 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/4W |
| R3 | RESISTOR (CARBON) | 18K Ω \pm 5% 1/4W |
| R4 | RESISTOR (CARBON) | 3.3K Ω \pm 5% 1/4W |
| R5 | RESISTOR (CARBON) | 22K Ω \pm 5% 1/4W |
| R6 | RESISTOR (CARBON) | 5.1K Ω \pm 5% 1/4W |
| R7 | RESISTOR (CARBON) | 22K Ω \pm 5% 1/4W |
| R8 | RESISTOR (CARBON) | 10K Ω \pm 5% 1/4W |
| R9 | RESISTOR (CARBON) | 910K Ω \pm 5% 1/4W |
| R10 | RESISTOR (CARBON) | 1M Ω \pm 5% 1/4W |
| R11 | RESISTOR (CARBON) | 150K Ω \pm 5% 1/4W |
| R12 | RESISTOR (CARBON) | 300K Ω \pm 5% 1/4W |
| R13 | RESISTOR (CARBON) | 5.6K Ω \pm 5% 1/4W |

POW-183CL

| Symbol | Description | Specifications |
|--------|-------------------|-----------------------------|
| R14 | RESISTOR (CARBON) | 7.5K Ω \pm 5% 1/4W |
| R15 | RESISTOR (CARBON) | 1.2K Ω \pm 5% 1/4W |
| R16 | RESISTOR (CARBON) | 7.5K Ω \pm 5% 1/4W |
| R17 | RESISTOR (CARBON) | 2.2K Ω \pm 1% 1/4W |
| R18 | RESISTOR (METAL) | 27K Ω \pm 1% 1/4W |
| R19 | RESISTOR (METAL) | 10K Ω \pm 1% 1/4W |
| R20 | RESISTOR (CARBON) | 56K Ω \pm 5% 1/4W |
| R21 | RESISTOR (METAL) | 27K Ω \pm 1% 1/4W |
| R22 | RESISTOR (METAL) | 100K Ω \pm 1% 1/4W |
| R23 | RESISTOR (METAL) | 27K Ω \pm 1% 1/4W |
| R24 | RESISTOR (METAL) | 8.2K Ω \pm 1% 1/4W |
| R25 | RESISTOR (CARBON) | 51K Ω \pm 5% 1/4W |
| R26 | RESISTOR (CARBON) | 13K Ω \pm 5% 1/4W |
| R27 | RESISTOR (CARBON) | 13K Ω \pm 5% 1/4W |
| R28 | RESISTOR (METAL) | 27K Ω \pm 1% 1/4W |
| R29 | RESISTOR (METAL) | 12K Ω \pm 1% 1/4W |
| R30 | RESISTOR (CARBON) | 68K Ω \pm 5% 1/4W |
| R31 | RESISTOR (METAL) | 1.5K Ω \pm 1% 1/4W |
| R32 | RESISTOR (METAL) | 27K Ω \pm 1% 1/4W |
| R33 | RESISTOR (CARBON) | 36K Ω \pm 5% 1/4W |
| R34 | RESISTOR (CARBON) | 120K Ω \pm 5% 1/4W |
| R35 | RESISTOR (METAL) | 510K Ω \pm 1% 1/4W |
| R36 | RESISTOR (METAL) | 12K Ω \pm 1% 1/4W |
| R37 | RESISTOR (METAL) | 36K Ω \pm 1% 1/4W |
| R38 | RESISTOR (METAL) | 1.8K Ω \pm 1% 1/4W |
| R39 | RESISTOR (CARBON) | 75K Ω \pm 5% 1/4W |
| R40 | RESISTOR (METAL) | 560 Ω \pm 1% 1/4W |
| R41 | RESISTOR (METAL) | 300 Ω \pm 1% 1/4W |
| R42 | | |
| R43 | RESISTOR (CARBON) | 100 Ω \pm 5% 1/4W |
| R44 | RESISTOR (METAL) | 82K Ω \pm 1% 1/4W |
| R45 | | |
| R46 | | |
| R47 | RESISTOR (CARBON) | 10 Ω \pm 5% 1/4W |
| R48 | RESISTOR (METAL) | 10K Ω \pm 1% 1/4W |
| R49 | RESISTOR (METAL) | 820 Ω \pm 1% 1/4W |
| R50 | RESISTOR (CARBON) | 22K Ω \pm 5% 1/4W |
| R51 | RESISTOR (CARBON) | 150K Ω \pm 5% 1/4W |
| R52 | RESISTOR (CARBON) | 200 Ω \pm 5% 1/4W |
| R53 | RESISTOR (CARBON) | 4.7K Ω \pm 5% 1/4W |
| R54 | RESISTOR (CARBON) | 75K Ω \pm 5% 1/4W |
| V | VARIATOR | SNR-A420K |
| 7D1 | 7FNER DIODE | G7B-12C |
| ZD2 | ZENER DIODE | GZA5, 6Y |

6. TROUBLESHOOTING

6-1 Check before and after troubleshooting.

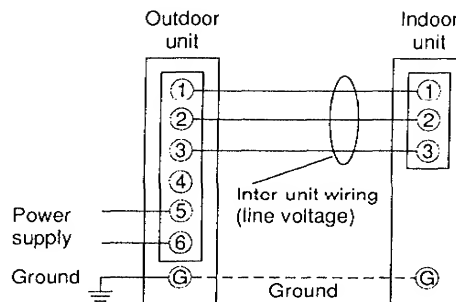
(1) Check power supply wiring.

- Check that power supply wires are correctly connected to terminals No. 5 and No. 6 on the 6P terminal plate in the outdoor unit.

(2) Check inter-unit wiring.

- Check that inter-unit wires are correctly connected to indoor unit from outdoor unit.

Power supply:
60Hz, single-phase, 230/208V



(3) Check power supply.

- Check that voltage is in specified range ($\pm 10\%$ of the rating).
- Check that power is being supplied.



WARNING:

If the following troubleshooting must be done with power being supplied, be careful about any **uninsulated live part** that can cause **ELECTRIC SHOCK**.

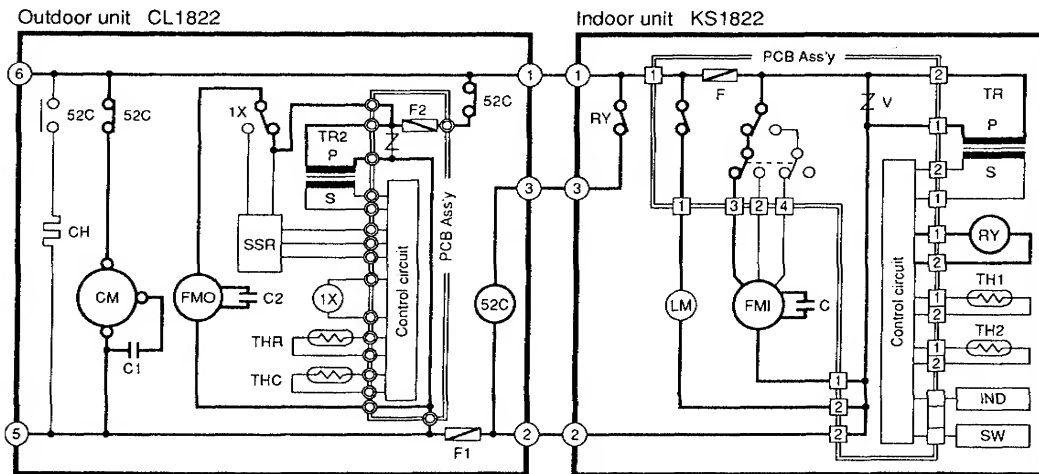
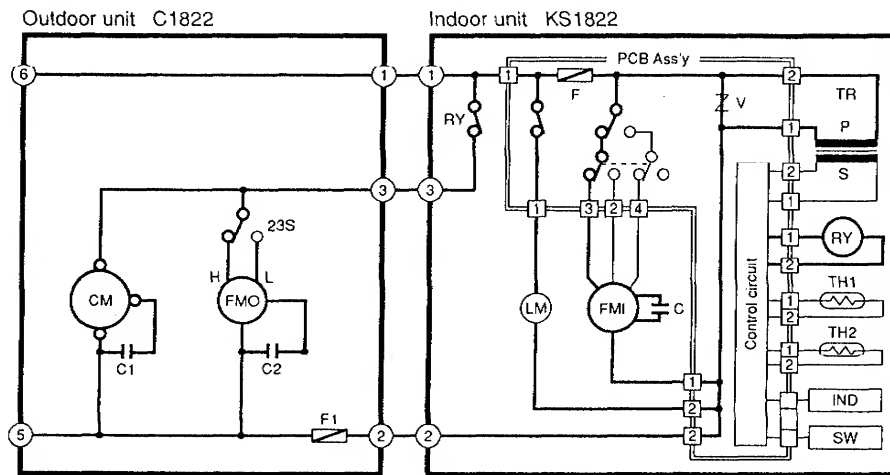
(4) Check lead wires and connectors in indoor and outdoor units.

- Check that coating of lead wires is not damaged.
- Check that lead wires and connectors are connected firmly.
- Check that wiring is correct.

(5) Reference

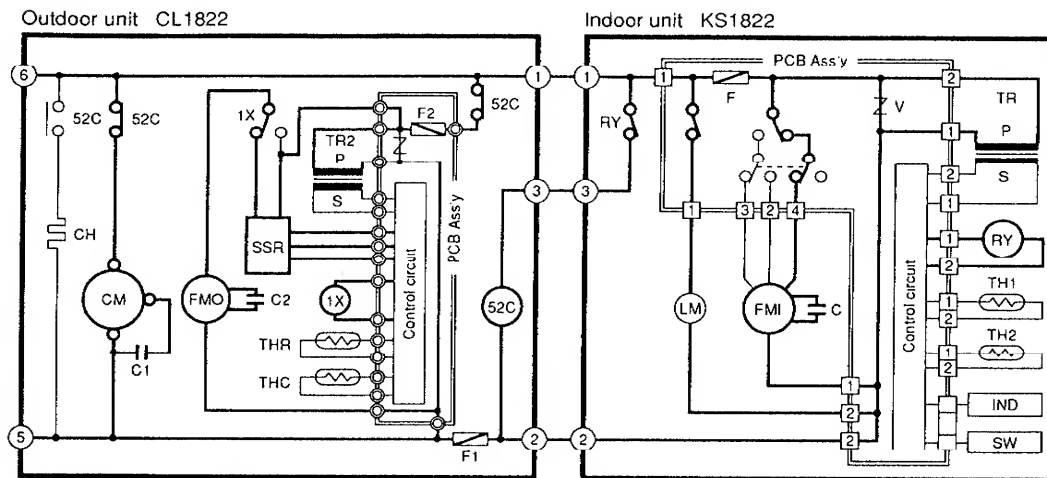
(a) Condition of general cooling operation

ON/OFF operation button..... ON
 COOL/FAN selector switch COOL
 SWEEP button ON
 Indoor fan speed HIGH
 Thermo..... ON
 Outdoor air temperature..... above 79°F



(b) Condition of cooling operation under low ambient temperature

ON/OFF operation button..... ON
 COOL/FAN selector switch COOL
 SWEEP button..... ON
 Indoor fan speed LOW
 Thermo..... ON
 Outdoor air temperature..... below 68°F



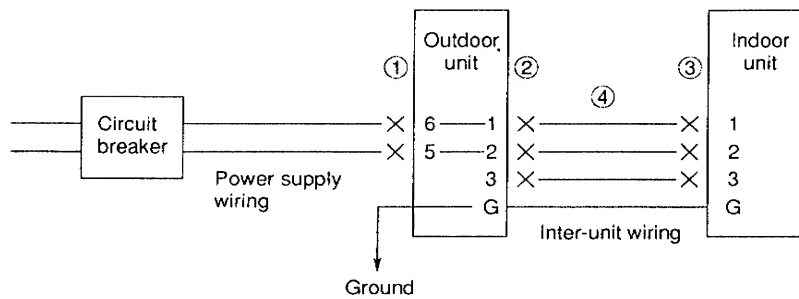
6-2 Air conditioner does not operate.

(1) Circuit breaker trips (or fuse blows).

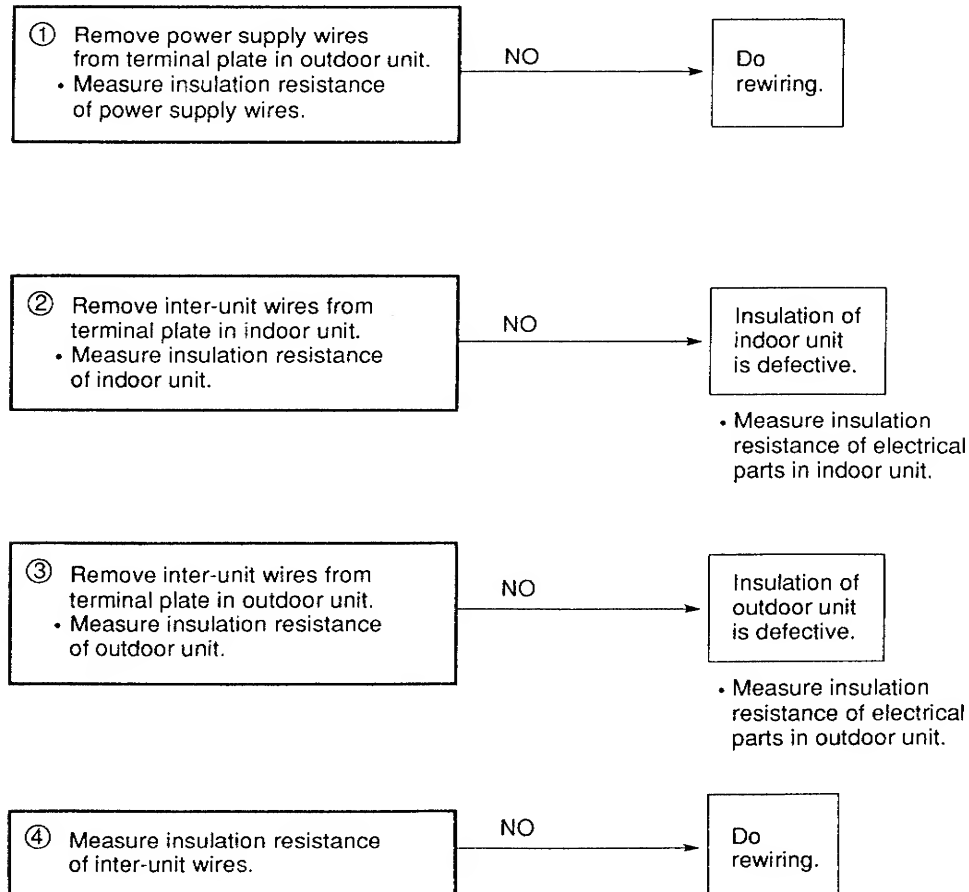
(a) When circuit breaker is set to ON, it trips in a few moments (resetting is not possible).

- There is a possibility of ground fault.
- Measure insulation resistance.

If resistance value is $1\text{M}\Omega$ or less, insulation is defective ("NO").



* Set circuit breaker to OFF.



(b) Circuit breaker trips in several minutes after turning air conditioner ON.

- There is a possibility of short circuit.

- Check capacity of circuit breaker.

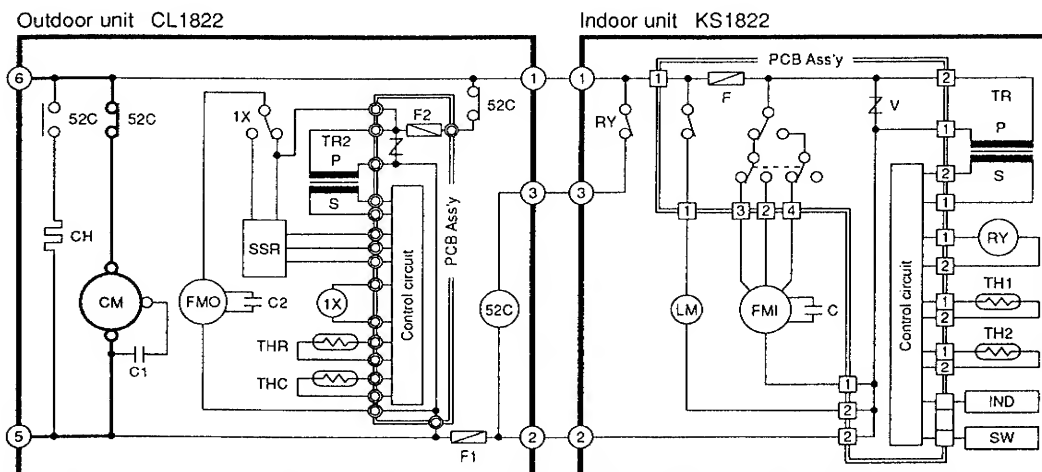
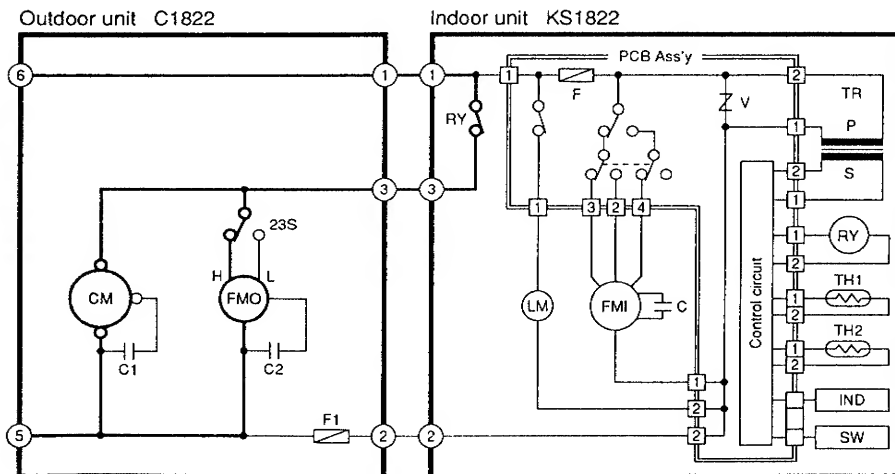
Is capacity of circuit breaker suitable?

Replace it with suitable one (larger capacity).

- Measure resistance of compressor motor winding.

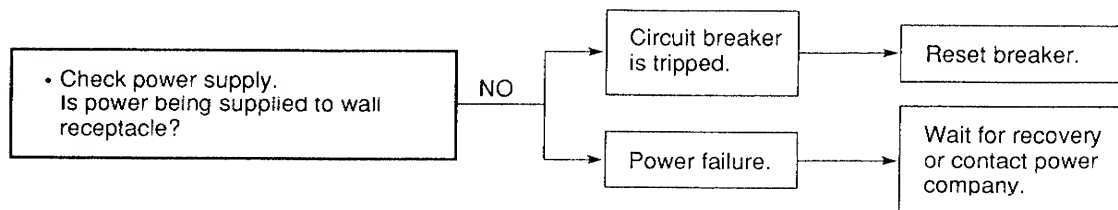
- Measure resistance of outdoor fan motor winding.

➡ Only C1822

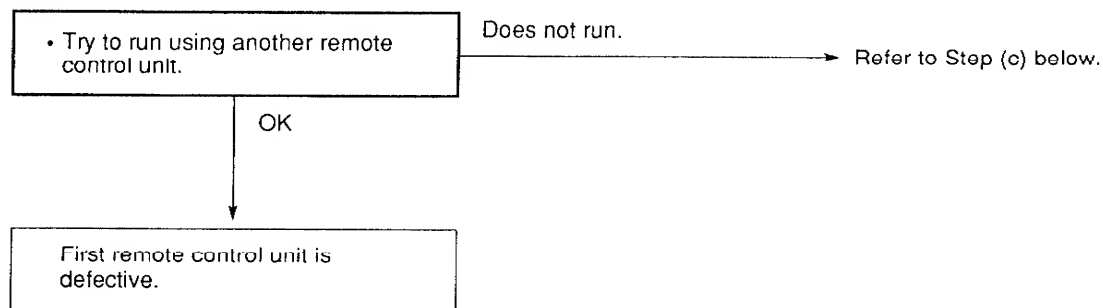


(2) Neither indoor unit nor outdoor unit runs.

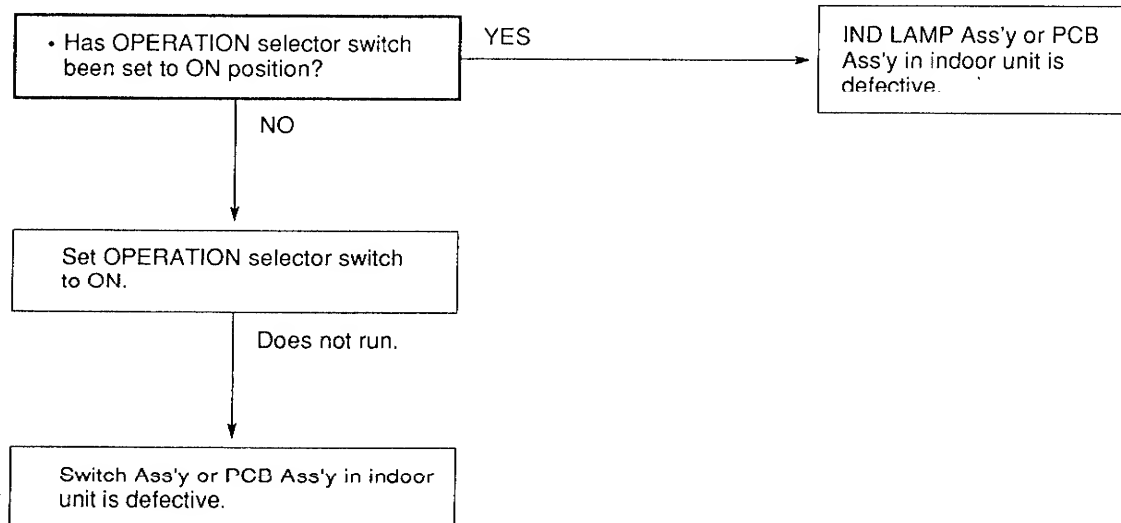
(a) Power is not supplied.



(b) Check remote control unit.

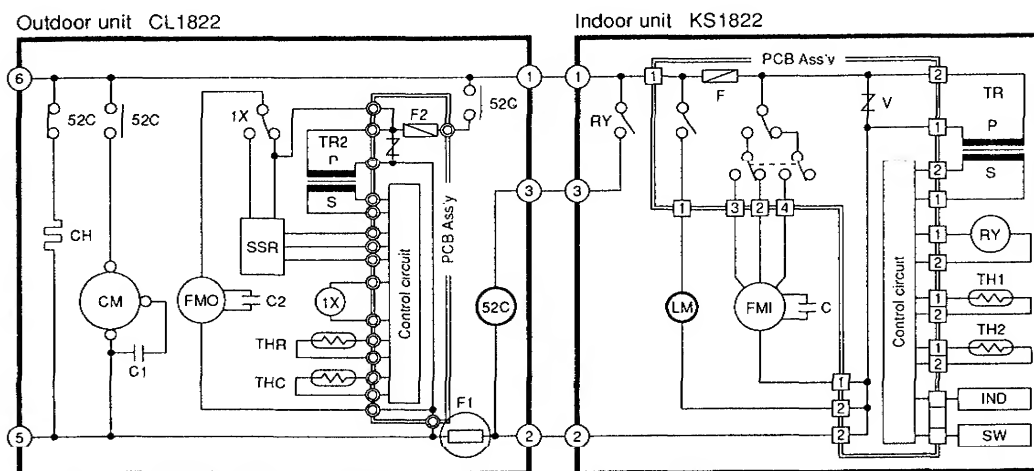
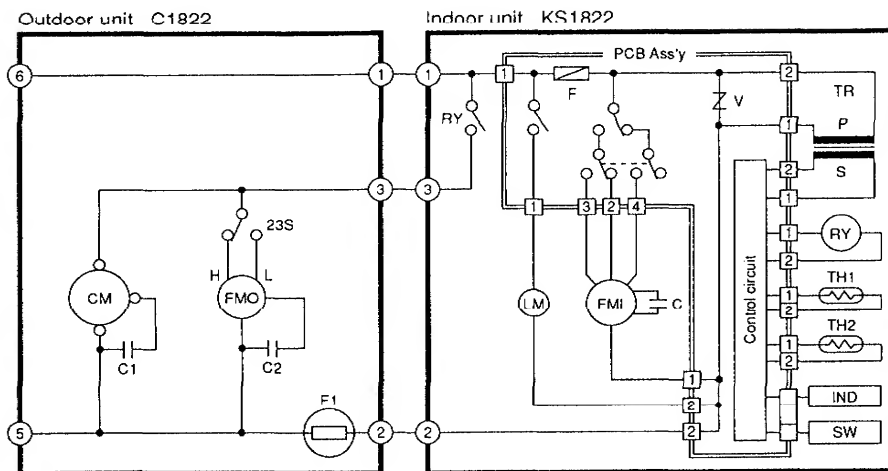
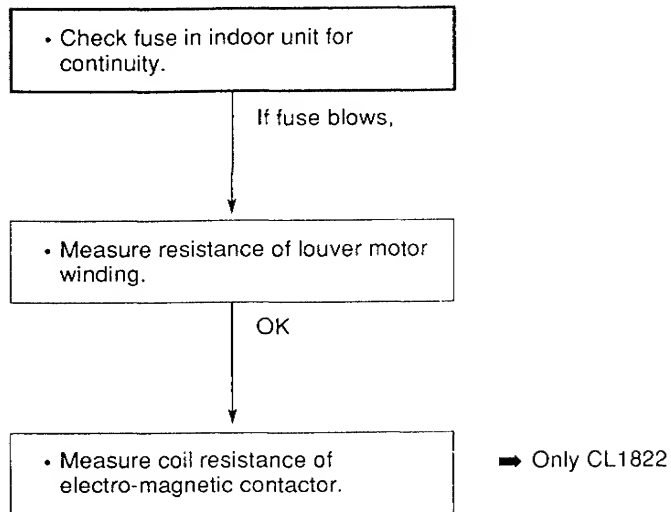


(c) Check OPERATION selector switch in indoor unit.



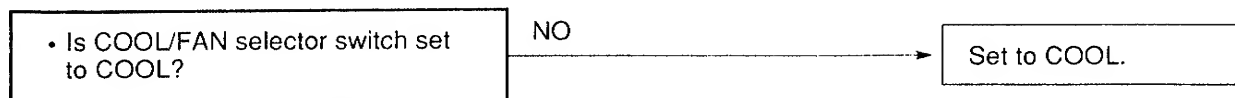
(Neither indoor unit nor outdoor unit runs.) (cont'd)

(d) Check fuse in indoor unit.



(3) Only outdoor unit does not run.

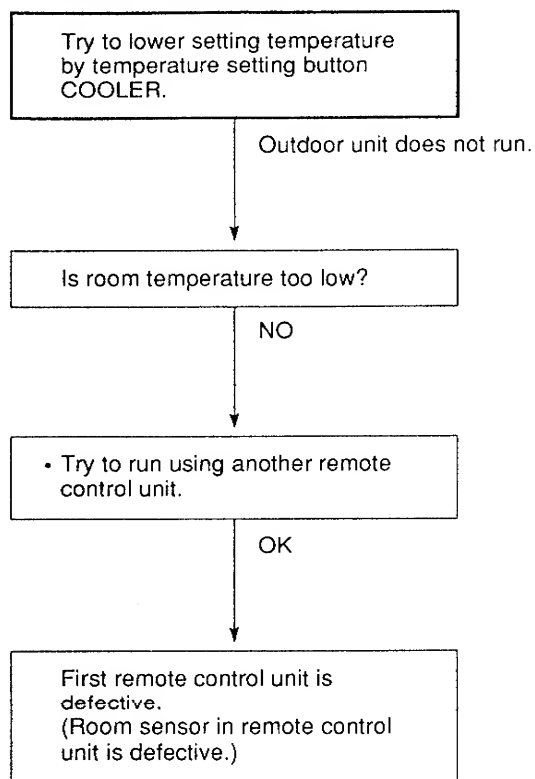
(a) Check COOL/FAN selector switch of remote control unit.



(b) Outdoor unit does not run when air conditioner is in following conditions.

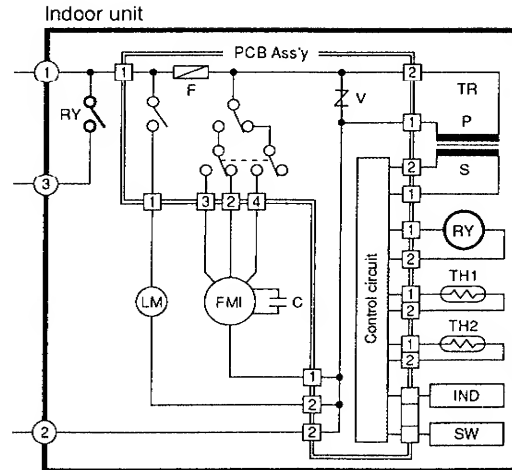
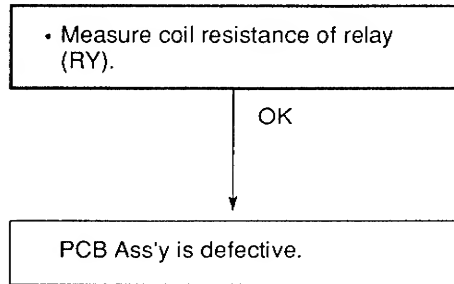
- During thermo OFF (when the room temperature is below the setting temperature).
- During freeze prevention (for at least 6 minutes).

• Check setting temperature

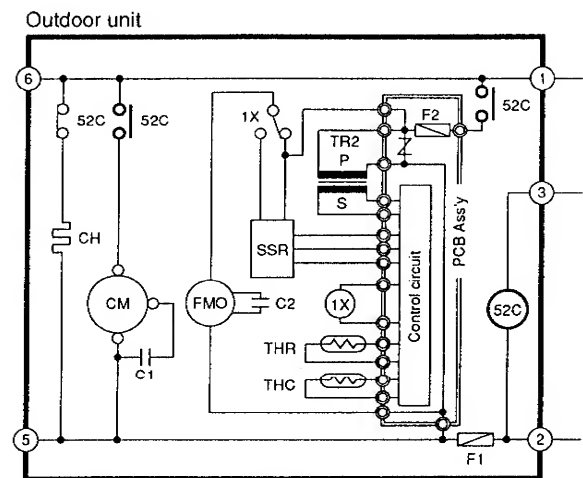
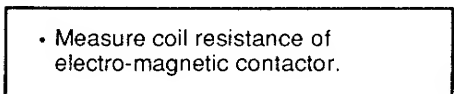


(Only outdoor unit does not run.) (cont'd)

(c) Check relay (RY) in indoor unit.

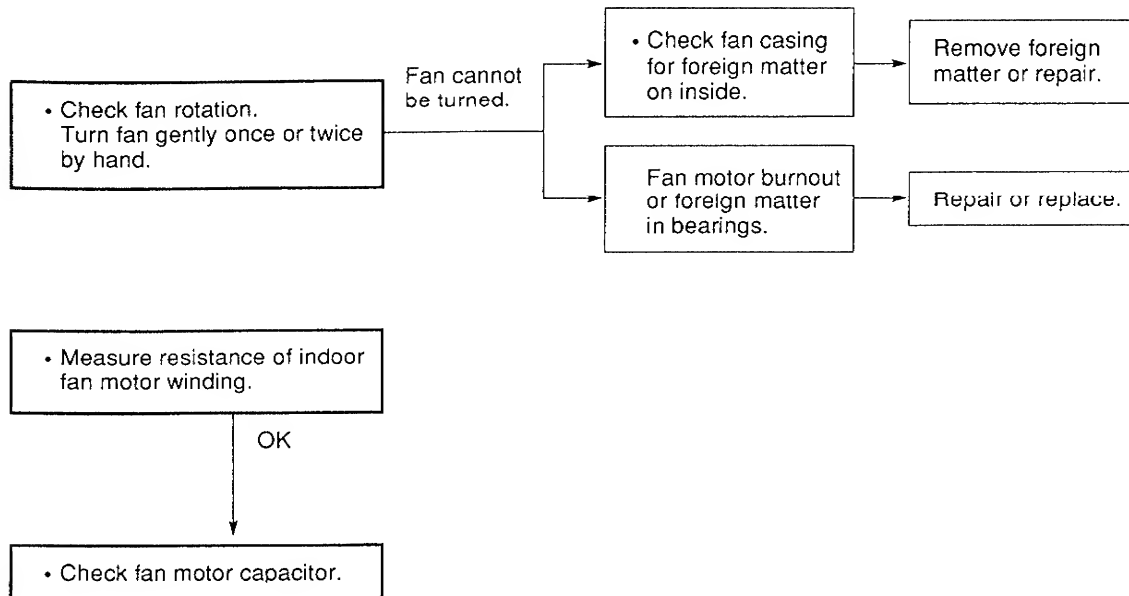


(d) Check electro-magnetic contactor (CL1822 only).

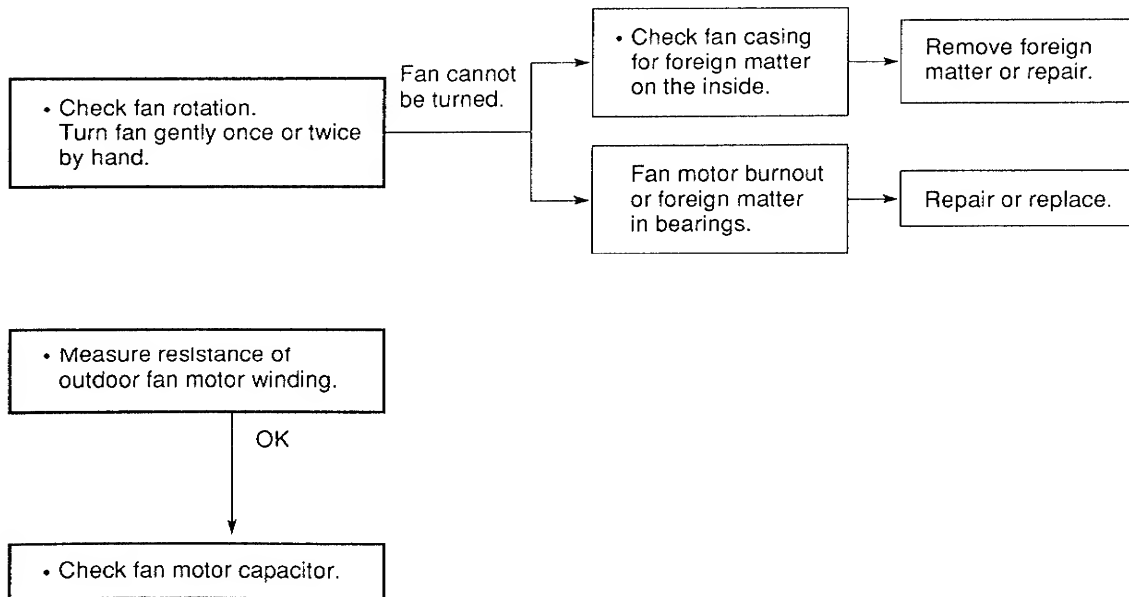


6-3 A particular component of air conditioner does not operate.

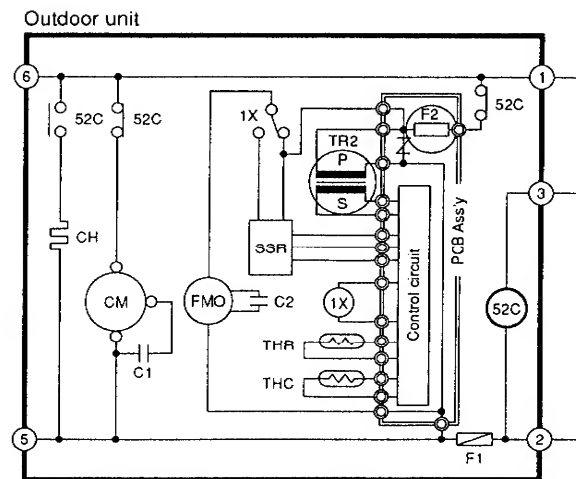
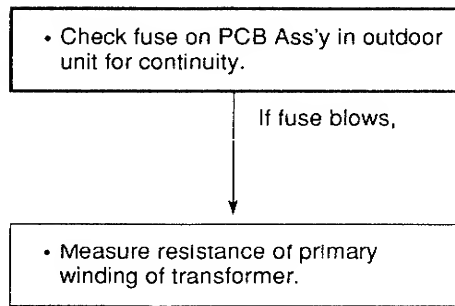
(1) Only indoor fan does not run.



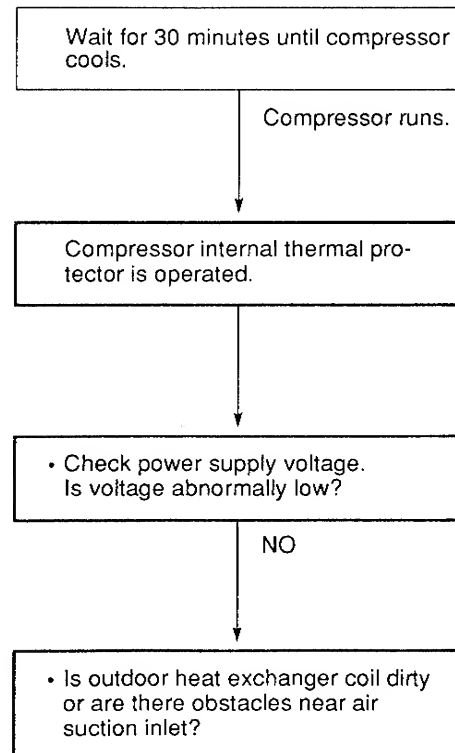
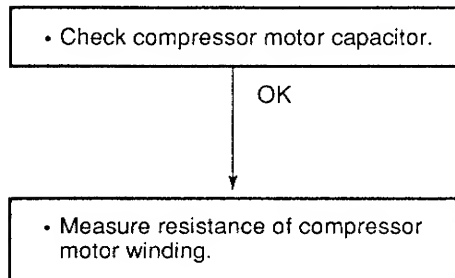
(2) Only outdoor fan does not run.



(3) Only outdoor fan does not run for CL1822.

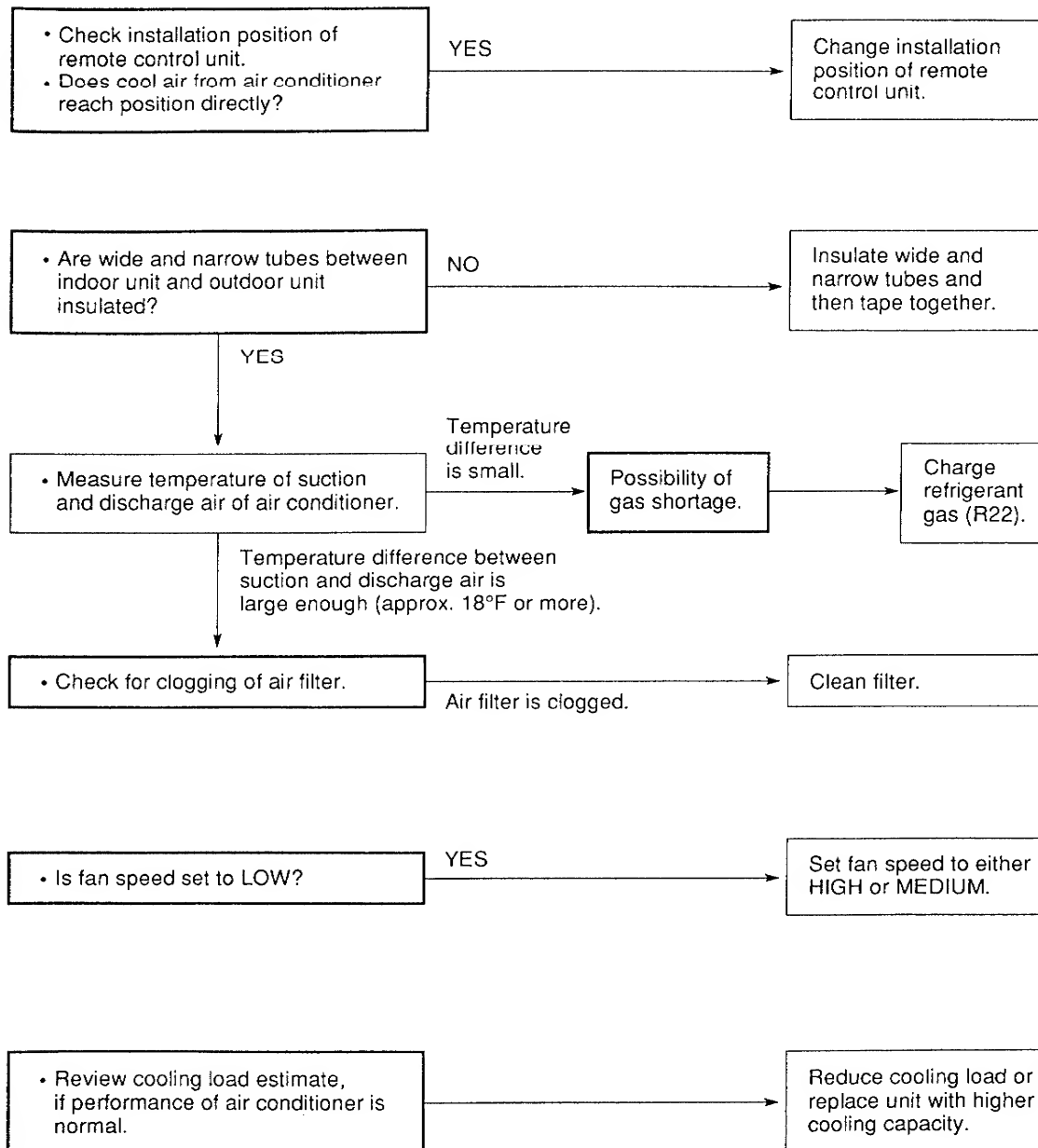


(4) Only compressor does not run.

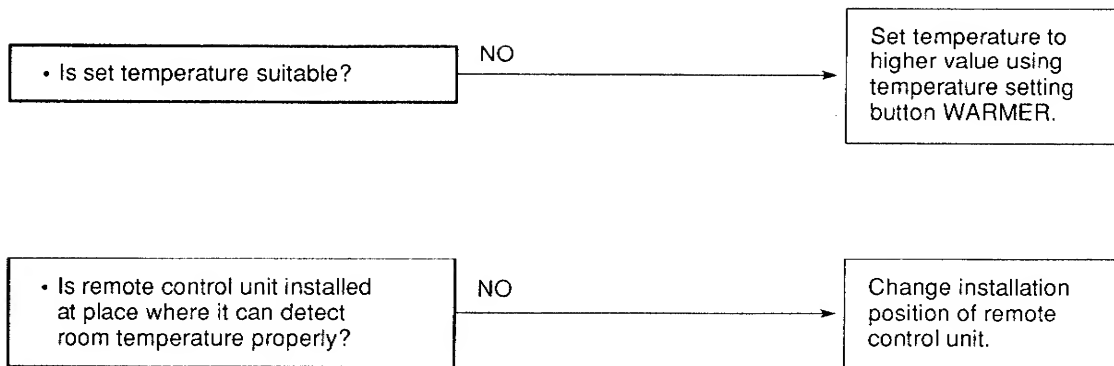


6-4 Air conditioner operates, but abnormalities occur.

(1) Poor Cooling



(2) Excessive Cooling



6-5 Indoor (heat exchanger) coil temperature sensor (TH1) is defective.

(1) Open

Even though the air conditioner does not thermo OFF, compressor and outdoor fan repeat ON for 10 minutes and OFF for 6 minutes

(2) Shortage

When dehumidified water freezes in the indoor coil, the freeze prevention function does not work.

7. CHECKING ELECTRICAL COMPONENTS

7-1 Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds 1 MΩ.

(1) Power Supply Wires

Clamp the grounded wire of the power supply wires with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the power wires. (Fig. 1)

Then measure the resistance between the grounded wire and the other power wires. (Fig. 1)

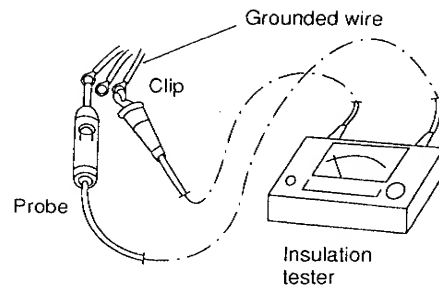


Fig. 1

(2) Indoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on ①, and then ② on the terminal plate. (Fig. 2)

(3) Outdoor Unit

Clamp a metallic part of the unit with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on ⑤, and then ⑥ on the terminal plate. (Fig. 2)

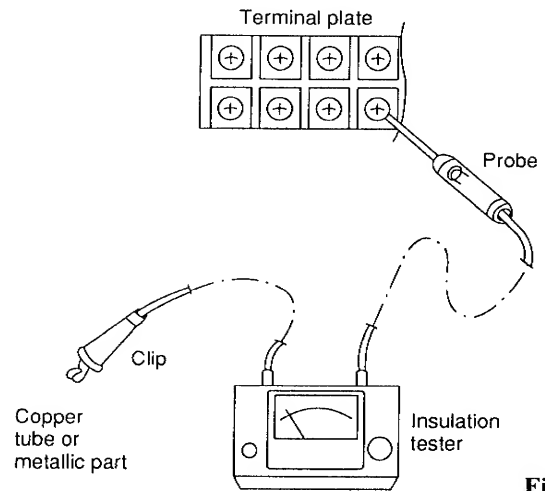


Fig. 2

(4) Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, PCB Ass'y, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 1 to 4)

Refer to Electric Wiring Diagram.

Note: If the probe cannot enter the poles because the hole is too narrow then use a probe with a thinner pin.

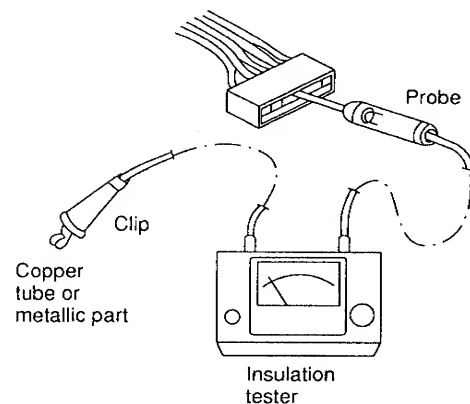


Fig. 3

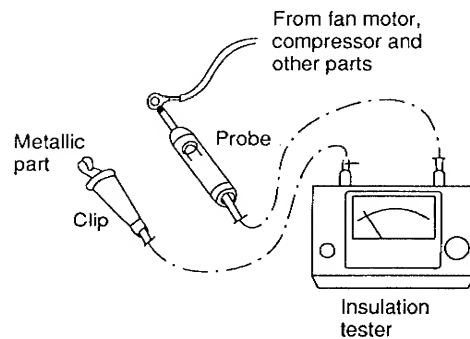


Fig. 4

7-2 Checking Continuity of Fuse on PCB Ass'y

- Check for continuity using a multimeter as shown in Fig. 5.

Note:

Method Used to Replace Fuse on PCB Ass'y

1. Remove the PCB Ass'y from the electrical component box.
2. Pull out the fuse at the metal clasp using pliers while heating the soldered leads on the back side of the PCB Ass'y with a soldering iron (30W or 60W). (Fig. 6)
3. Remove the fuse ends one by one. For replacement, insert a fuse of the same rating and solder it. (Allow time to radiate heat during soldering so that the fuse does not melt.)



CAUTION:

When replacing the fuse, be sure not to break down the varistor.

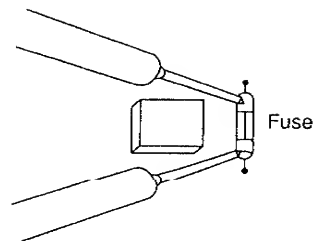


Fig. 5

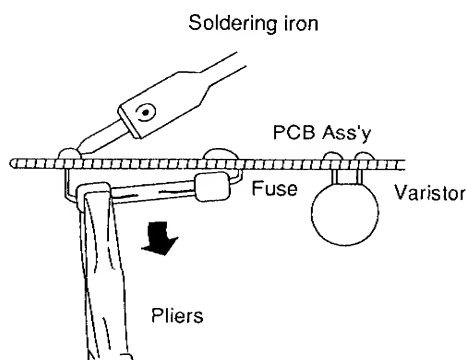


Fig. 6

7-3 Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 7. Observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

The capacitor is "good" if the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

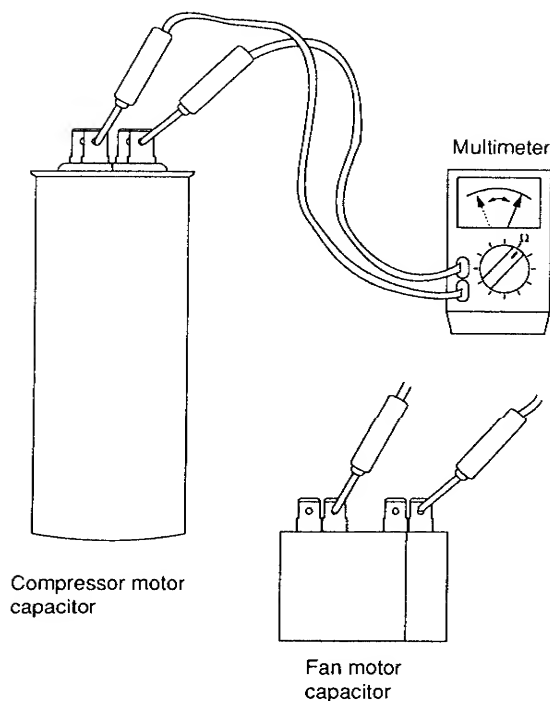


Fig. 7

7-4 Appearance of Electrical Parts

(1) Relay

DFU12D1-F (M)

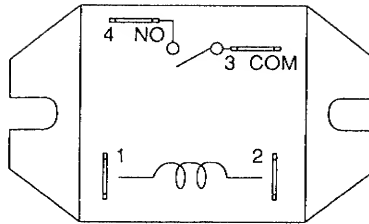


Fig. 8

(2) Thermostat

MQT5S 27YZ

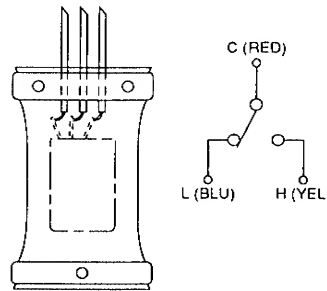


Fig. 9

(3) Electro-Magnetic Contactor

CLK-16E3-21

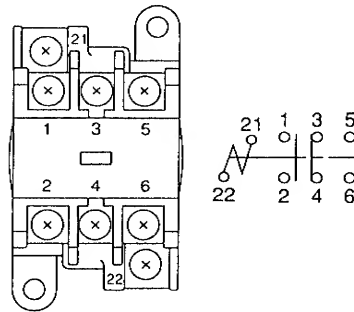


Fig. 10

(4) Relay

MY2F-T1-USTS

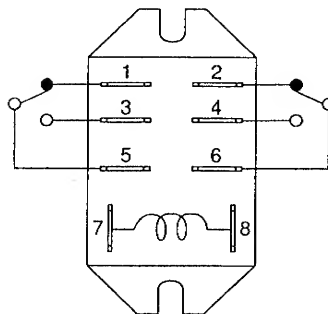


Fig. 11

(4) SSR (solid state relay)

G3L-205TL-TS1

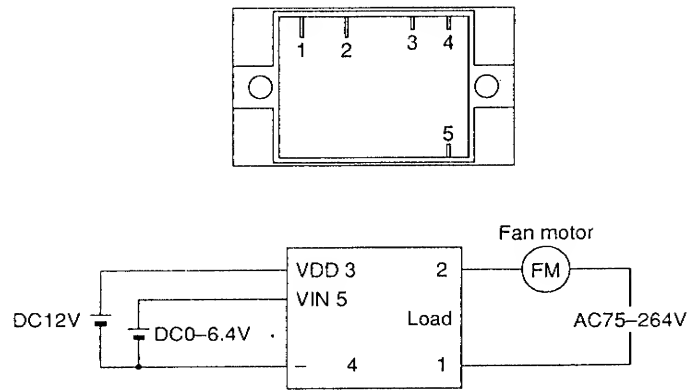


Fig. 12